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## KEYNOTE ADDRESSES

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Remarks prepared for Delivery by

The Honorable Dr. Stephen D. Van Beek, *Associate Deputy Secretary of Transportation*

During the

Symposium on Weather Information  
for Surface Transportation

***Delivering Improved Safety and Efficiency for Tomorrow***

Thank you, Sam (Williamson), and good morning everyone. And thank you for attending our first major meeting on weather information for surface transportation.

Charles Dudley Warner, an African American writer and co-author of *The Gilded Age* with Mark Twain, once said, “Everybody talks about the weather, but nobody does anything about it!” And I had sworn to myself that I wouldn’t use that oft-used quote today. But, upon reflection, I decided it sets the right tone for this morning’s agenda.

We can’t control the weather (at least not yet!), but we are doing something about it in terms of actions to improve safety and mobility in inclement weather. As Sam said, we have been working with our meeting co-sponsors, the National Oceanic and Atmospheric Administration (NOAA) and the Office of the Federal Coordinator for Meteorology (OFCM), to develop improved and better coordinated weather forecasting for surface transportation. We appreciate their leadership and involvement and look forward to working with them to see a national weather information system for surface transportation put into place.

Dr. James Baker is our other keynote speaker, and I look forward to hearing what he has to say about the issues and the challenges involved. He’s a strong partner in many of our aviation and maritime activities, and I’m happy to extend that partnership to surface transportation as well.

### **Why Weather Forecasting for Surface Transportation?**

Today, I am going to focus my remarks on why it is important to improve weather forecasting and warning systems for surface transportation, and what kind of coordination is needed for success.

Traditionally, the focus of weather forecasting has been on conditions in the atmosphere and general precipitation, with only the most general information on road conditions. We’ve all

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heard local weather updates or news anchors say that roads are “slick” in places or are “passable”. DOT believes that safety, mobility and productivity can be greatly improved by providing the public with: (1) information that is route-specific; (2) more accurate near-term weather predictions; and (3) reports about conditions that specifically affect the decisions surface transportation users and managers make. This is equally true for both roadway and railroad track bed conditions and waterways.

Providing weather information for surface transportation is a multi-step process. It starts with the excellent foundation of national and commercial weather service products, which can be tailored into the specific types of road-weather information that best meet the needs of users, whether they be travelers or a maintenance crew. Pulling together and communicating this information requires extra work and coordination on the part of both the weather and transportation communities from both federal and state agencies, many which are represented here today. We believe that joint programs with the Department of Commerce for observational systems and enhanced products are needed.

While detailed weather forecasting for surface transportation will certainly benefit metropolitan areas, it’s also true that the roads and railroad tracks of rural America, where most of America doesn’t live but where many travel, would benefit from improved road-weather information.

Having better weather information is not just a matter of convenience -- it is about saving lives. Each year in this country, we have an average of 6,500 fatal roadway crashes occurring during bad weather, which are about 17 percent of all fatal crashes. Of those, 60 percent happen in rural areas, primarily on non-interstate roads. But even the interstates can be affected, as we saw in last weekend’s huge bus crash on Pennsylvania’s I-80, where 4 chartered buses followed each other off the road with fatal consequences.

In addition to travelers, snow plow drivers and other maintenance staff could benefit from better weather and road condition information. We have found through research that if storm maintenance crews knew more about road conditions ahead of time, they could cut snow removal operating costs, particularly for materials and labor, by about 10 percent. Given that about \$2 billion is spent each year on snow and ice control, that’s a potential taxpayer savings on the order of \$200 million.

Detailed weather forecasts for surface transportation could also help traffic managers, school administrators, transit, and commercial truck operators.

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We believe that we can -- and should -- use weather forecasting to prepare people better for trips by truck, train, and commuter rail. We benefit from this information when 16 percent of us travel by plane, so why not do the same for the 84 percent of us moving on surface transportation? We have an extensive aviation weather program and our FAA maintains close working relationships with the OFCM and the National Weather Service. For this reason, we have tangible products and services such as terminal and route forecasts that serve needs for safety and optimal flight planning. The FAA and National Weather Service participate in joint programs for observational systems and weather services for aviation in the National Aviation Weather Center and the Center Weather Service Units. These joint programs provide weather support to air space users and air traffic controllers over the entire airspace system.

Right now, we don't have that kind of comprehensive and reliable capability for our surface transportation system, but the latent demand is there. People are showing an interest in smart vehicles that can anticipate problems and help them decide to take alternate routes. Millions of people who log onto *Weather.com* and similar websites are looking for travel-related weather information so they can anticipate hazards and make their trip safer and less stressful.

Christine Johnson and others in the Federal Highway Administration (FHWA) think that weather forecasting for surface transportation is a good idea and have reached out to the OFCM and the NOAA weather experts. They, too, thought it was a good idea. So, now we have a Joint Action Group (JAG) to define the needs and to coordinate efforts toward developing a national weather forecasting system for surface transportation.

Developing solid weather forecasting for surface transportation - highways, rail and transit - will require a broad and strong public/private partnership to make it work. Many state DOTs are already developing weather forecasting systems for surface transportation, particularly in mountainous and storm-prone regions. Several multi-state initiatives are bringing ITS together with advanced weather prediction systems to create operational highway management and traveler information systems throughout North America. These programs envision a widely accessible road and weather information system that will support seamless information sharing for travelers, highway maintenance managers, and transportation operations managers.

Hurricanes demand attention because of their impact on coastal developments, beaches, and, of course, roads and highways. Emergency managers and travelers depend on road condition information before and during hurricanes because escaping the path of the storm could

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mean life or death. Not only do they need to know if the roads are open, but also if the roads have reached capacity.

In the case of Hurricane Floyd, the transportation system became overloaded, with some people taking 18 hours to reach shelters. While this took less time than the road models predicted, the public found the delays unacceptable. They think we could do much better, and they are probably right.

Some states are moving ahead with specialized road and weather information systems. Washington State transportation officials report mountain pass road weather conditions on the Internet to help travelers. One official noted: "After getting 10 million hits on the website during the 1997-98 winter season, we discovered the traveling public has a voracious appetite for road and weather condition information." Thus, Washington State DOT joined a consortium of agencies that need weather information and, together, they are implementing a system for providing travelers with more and better weather information. Washington State recently installed an automated weather station for state ferries that cross the Puget Sound.

Another initiative sponsored by the Federal Highway Administration and the North and South Dakota DOTs is the Advanced Transportation Weather Information System (ATWIS). This system is the first rural road condition information and weather forecast in-vehicle system in the United States. Very specific local forecasts are made available to cellular phone users through a computer telephone system that queries them about their location and their direction of travel. During one snowstorm, the system can accommodate up to 2,000 calls.

It's not surprising that technology will play a key role in developing a system that provides accurate, tailored weather and surface transportation information. And, DOT's ITS program is working to bring the technologies together with the communication systems we have in place. We are collaborating with industry, universities, and other research organizations to provide the vehicle technologies and the mechanisms to get the right information to the right people at the right time.

One example of our efforts is the new Dedicated Short-Range Communication (DSRC) ruling by the FCC, which will enable providers to send route-specific road condition information directly to the vehicle. We are working with state and local transportation officials to employ sensors to detect road and weather conditions for better and more efficient winter road maintenance, particularly in northern states.

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Everything we are considering is not necessarily expensive or high tech; many weather-related solutions are low-tech and practical. For example, at bridges and overpasses or sites where ice tends to form, we can install detectors connected to electronic signs that warn drivers of the icy conditions. This solution is both simple and inexpensive.

The Federal Transit Administration (FTA) plays an important role in the Department's efforts to improve weather information for surface transportation. FTA is working with the Federal Highway Administration and the other modal administrations to encourage deployment of Intelligent Transportation System technologies to improve rail and bus transportation system management.

FTA is working with ITS to develop and deploy Automatic Vehicle Location systems based on Global Positioning Satellites and Geographic Information Systems to keep buses, light rail, and pedestrians safe. They are also using variable information signage, and automatic passenger counting data streams to assess fleet management strategies.

FTA is currently testing a remote sensing device in Las Vegas, Nevada, to improve the air quality attributed to the pollution and dust from the Los Angeles air basin and the San Joaquin Valley. FTA has also implemented an air quality model called TRANSIMS (Transportation Analysis and Simulation System), which analyzes air quality and emissions impacts from transport using National Weather Service data.

### **Conclusion**

Now is the time to invest in infrastructure improvements like ITS for weather forecasting because we have the strongest Post-Cold War economy.

Since 1993, President Clinton and Vice President Gore have led America in preparing for the 21<sup>st</sup> Century. Under their leadership, we have a balanced budget, nearly 20 million new jobs, and the lowest unemployment in 30 years.

With such a strong economy, we have the opportunity to invest in America's infrastructure and create a transportation system that will help us continue to prosper as a Nation.

President Clinton and Vice President Gore understand the connection between upgrading our transportation infrastructure and growing our economy. Under the Transportation Equity Act for the 21<sup>st</sup> Century, we will invest more than \$200 billion to upgrade our transportation system over the six-year life of the law. This year alone, the ITS program will receive \$211 million in funding. Of the \$98 million allotted to ITS research and development, the Weather and Winter Mobility program will receive about \$2 million.

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This is an opportune time to improve both safety – DOT’s number 1 goal -- and mobility -- our 2<sup>nd</sup> most important goal. So, let's work together and communicate often at forums like this one.

DOT will collaborate with the OFCM and the National Weather Service to make the case for investment in our Nation’s weather information system. Two critical foundation pieces are already ongoing -- the National Weather Service modernization and DOT’s investment in Intelligent Transportation Systems. Let's find ways to maximize these investments to achieve our safety, mobility and productivity goals. Further, we want to develop an *esprit de corps* across all the key parties - the meteorological community, the surface transportation community, the public agencies, and the private industry -- toward the end of safer surface travel.

Our ultimate goal is one the American people will, I hope, understand and applaud - to develop a national weather information system for surface transportation that will make travel safer and more efficient for the public we serve.

Thank you.

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Remarks prepared for Delivery by

The Honorable Dr. D. James Baker, *Under Secretary of Commerce for Oceans and Atmosphere*

During the

Symposium on Weather Information  
for Surface Transportation  
***Delivering Improved Safety and Efficiency for Tomorrow***

Good morning. Thank you for participating in this very important symposium, which recognizes the first-ever alliance, at the federal level, of the transportation and meteorological communities.

NOAA is delighted to work with all of you to integrate weather products and services in a way that will bring critical information home to everyone in America – whether that means learning about weather hazards while operating tractor trailers or when docking ships, seeing them graphically in cars, or getting alarms about approaching flash floods over the 24-hour NOAA Weather Radio network.

The challenges – and opportunities – belong to both the public and private sectors. The key is to combine our shared knowledge and resources, and to put them to work for a safer, stronger Nation.

Under DOT, Secretary Slater, Associate Deputy Secretary Van Beek and their staffs have organized a series of key initiatives. These have brought us a vision and a framework for improving the safety and efficiency of current and future transportation systems. I am pleased to recognize the work of the Federal Highway Administration in drawing attention to weather information needs for surface transportation.

At NOAA, we are fortunate to have the committed leadership of Sam Williamson. Sam directs NOAA's Office of the Federal Coordinator for Meteorology – a co-sponsor of this symposium.

Both the operational and developmental sides are paramount in developing improved and better-coordinated weather forecasting for surface transportation. On the operational side, we have the National Weather Service; private weather companies that are facilitating the flow of weather data to the media and tailoring it specifically for railroads and trucking and agricultural needs, among others; and the media itself.

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On the developmental side, the National Research Council under the National Academy of Sciences is focusing the efforts of our communities on developing and improving intelligent transportation systems through the Transportation Research Board. There are also 16 university transportation centers looking at such developmental areas as road weather, alternative fuel, and research for intelligent vehicles and highways. And the National Center for Atmospheric Research is examining technology aimed at factoring meteorological data into decision-support systems.

Already, designers and providers are better able to integrate weather information – and everyone will benefit, in both the public and private communities. Effectively integrating weather information, for example, means that we can also make better use of our pipelines because temperature changes impact not only consumption, but also the flow of oil and gas.

Our entire transportation system comprises 11 percent of the Nation's GNP...internationally, over \$200 billion in trade is accommodated by various transportation systems.

And, of course, beginning with the Roman Empire's intricate road system, the protection of our transportation systems is vital to national security. Winston Churchill said, *Victory is the beautiful, bright-colored flower. Transport is the stem without which it could never have blossomed.* In the United States, safeguarding our interconnected highways, waterways and air transport is key to the success of our national defense.

Just as transportation is a determining factor in our lives, so is weather – a look at the 20<sup>th</sup> century's most devastating weather and climate events bears this out.

In 1992, Hurricane Andrew became the nightmare South Floridians had long-feared; a Category – 4 storm barreling into one of the East Coast's most populated areas.

Making 250,000 people homeless, and causing \$25 billion in damages. Andrew is the costliest hurricane to hit the United States this century. Transportation was indispensable to the evacuation and recovery efforts of the Red Cross, FEMA, and many others.

For the East and Northeast, the Superstorm of March 12-15, 1993 produced a snowfall as widespread as any in this century. Hundreds died and, for the first time, weather shut down every major airport in the affected regions.

Midwest floods in 1993, and in the Pacific Northwest in 1998, also brought devastation...many of you will recall that, in 1998, ice storms immobilized New England.

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And as you can see on this FEMA map, nearly every state experienced some form of weather-caused disaster in 1999...from ice-coated power lines in New England, to fires in Florida, and hurricanes, tornadoes, high winds, floods, and severe freezes in other parts of the country.

These disasters not only stun us with their ferocity – they reveal the growing sophistication of our professions and society in learning to cope with nature’s impressive powers. Among the destruction are major success stories:

The 1993 Superstorm marked a watershed in multi-day weather prediction. Computer models did an excellent job of predicting the storm’s strength and track, and the heavy snows were forecast days in advance. As a result, the airline and trucking industries used alternative routes and succeeded in relocating assets out of harm’s way.

Six months before the 1997-98 El Niño became a household word, our monitoring buoys detected a pool of warm water spreading across the Pacific Ocean. Early warnings reduced human loss and suffering, and marked the greatest triumph of long-range forecasters to date. With new tropical observing systems, satellites, and better science, the dramatic temperature shifts in the equatorial Pacific Ocean and accompanying weather changes were remarkably consistent with expectations. We can contrast the six-months’ heads-up for the most recent El Niño with what we didn’t know when the previous El Niño hit in 1982-83, causing tremendous damage across the United States. El Niño, in fact, was a little known phenomenon at the turn of the century.

And when one of the most intense tornado outbreaks possible overtook Oklahoma City this past May 3, the National Weather Service provided a remarkable 32-minute lead-time average for the first warnings issued in every affected county. Weather service products signaled the potential for severe weather as early as 36-hours prior to the outbreak.

Oklahoma City provides an outstanding case study of a natural disaster reduction operational process in action. Federal, state, and local partners, including the media and amateur radio operators, evoked effective and timely responses, and shaped positive outcomes that would not otherwise have occurred. Transportation was crucial in relocating people ahead of the tornadoes, and in providing medical assistance and recovery following the tornadoes.

We know of an instance in which a company owner heeded forecasts and kept his employees on-site. The forecasts – and his decision – saved lives.

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We are pleased that, by 1998, the National Weather Service provided both longer lead times and more precise forecasts for both tornadoes and floods. This graphic shows the improvements over the past 5 years.

But while we are better prepared than ever, we are also more vulnerable than ever. Especially vulnerable are our fragile, and increasingly populated, coastal areas and the economies – national and local – that depend on them. With over 50 percent of our population now living and working within 50 miles of the coast, and about 3,600 more people moving to coastal areas every single day, safe, efficient transportation systems and effective weather forecasting will only grow in importance.

America depends on healthy coasts. Coastal communities bring in over 30 percent of the GNP. The Nation's \$20 billion-a-year fishing industry depends on healthy marine habitats and diverse ocean life.

But already we are changing the chemistry of our waters. All along our coasts, polluted runoff is the major source of water pollution. Emissions, too, are of great concern. Environmental impact statements and transportation control plans will go some distance in helping to mitigate these critical concerns.

Our fast-changing world is also more wired than ever and this, too, makes us more vulnerable. We're now headed into another Solar Max cycle, a time of intense solar activity when we can expect increasingly turbulent space weather. You may remember how, during the last Solar Max, the Province of Quebec went dark because a geomagnetic storm caused power lines to overload.

Geomagnetic storms can impact power grids which, in turn, can directly impact rail and transit dependent on electrical power sources. Even if this kind of storm hits hundreds of miles from your location, it can generate excess current that has the potential to burn out transformers, trip circuit-breakers, and disrupt electrified rail systems.

NOAA's Space Environment Center in Boulder monitors the solar environment around-the-clock with a complex array of ground-based observations and satellites. And earlier this month, we introduced the first-ever space weather scales. These scales were developed in Boulder, and we call them the Richter scales of space weather. The scales are designed to characterize the severity and impact of upcoming solar storms on public safety and services.

Much has been accomplished. But, together, we still have a tremendous amount to do. It's not a matter of who gets a piece of the pie, but rather how we can pull together to do a better

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job. No pilot takes off without first getting a briefing – and we must begin to provide similar safeguards for all forms of surface transportation.

It will take public and private partnerships to tackle the concerns, particularly since vulnerability to weather increases as new technology becomes embedded in our transportation systems. Together, we need to provide better support to decision-makers so that people and property are safely and efficiently kept out of harm's way.

I am pleased that NOAA is supporting improvements in the planning, design, and safety of transportation – and in ways that benefit both our environment and the economy. The building blocks of our efforts are observations, numerical models, forecasts, and warnings. These efforts provide the basis for specialized weather services that tailor data for transportation systems.

Exciting technological breakthroughs in satellites, radar, sophisticated information systems, automated weather observing systems, and super speed computers shape up-to-date forecast and warning capabilities. The National Weather Service's recent \$4.5 billion modernization is benefiting every American – at a cost of just \$4 per person per year.

As I mentioned earlier, predictions are already faster and more accurate, and they are safeguarding lives and the economy. Data assimilation and collection needs are, in part, being addressed by NOAA Modeling Centers. These centers are developing or implementing the meteorological numerical models that shape forecasts. A telecommunications gateway links all weather service data and products to national and international customers.

Weather forecasting is also being significantly bolstered by a series of polar and geostationary satellites. With improved imaging and sounding capabilities, the NOAA-15 is the first in a series of five satellites designed to monitor global environmental events. The satellites will scan the Earth over the next 12 years, yielding continuous images of atmospheric temperatures, moisture, and aerosol distributions, and surface parameters such as snow and ice.

Combined with data from Doppler radars and automated surface observing systems, the real-time data gathered by geostationary satellites greatly aids weather forecasters in providing better warnings of thunderstorms, flash floods, hurricanes, and other severe weather.

An essential new system – the Advanced Hydrologic Prediction System – will significantly extend the Nation's ability to mitigate the impact of major floods and droughts. The economic benefits of this system will total about \$600 million annually. Weather and

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climatic prediction models will provide new forecast products depicting the magnitude and probability of river levels and river flow volumes several months into the future.

NOAA is committed to developing mid- and long-range climate forecasts that can be issued weeks, months, and even years in advance. The most recent El Niño brought home the value of longer-range forecasts. By monitoring changes from the deep oceans to the surface of the sun, NOAA will be able to provide the basis for understanding longer-term climate and environmental patterns that, in some manner, impact all forms of surface transportation.

In looking to the future, we envision great advances in computer and communication technologies that will provide immense improvements in safety and efficiency, but also have increased vulnerability to weather conditions.

Tailored observations and reporting networks are needed all along transportation routes, and high-resolution models are needed to provide more accurate information to decision-makers.

While intelligent transportation systems are now being developed to address current needs, the demand on transportation is already outstripping the pace of development. And that demand is expected to triple in 25 years.

However, the best prediction and assessment tools won't count unless we can get urgent information into the hands of those who most need it – *and when they most need it*. We are creating a Global Disaster Information Network for just this purpose. The Network will take us beyond monitoring, assessment and prediction to the dissemination of information when and where it is needed.

The Internet and other high-speed telecommunications provide the necessary technologies – and a disaster information network will be assembled by tapping data and other information sources from around the globe.

In partnership with other public and private agencies, NOAA is committed to solidifying the existing foundation of weather information, products, and services. We recognize that there will be exceptional and accelerating demands on evolving transportation systems well into the next century – and we look forward to addressing these challenges right along with you.

Just as you, we want to keep natural hazards from becoming natural disasters.

Thank you.